



Multidisciplinary Courses (Credit-3)

List of subject based Multidisciplinary Courses under Model Curriculum

Sl no.	Subject	Multidisciplinary Courses
1.	Biotechnology	Medical Biotechnology and Molecular Diagnostics
2.	Economics	Indian Economy and Society
3.	Psychology	Health Psychology
4.	Sanskrit	Samskrta –Sastra- Paricyah
5.	Sociology	Crime and Society
6.	English	Professional Writing
7.	Commerce	Fundamentals of Entrepreneurship and E-Commerce
8.	Zoology	Vector Borne Diseases and Epidemiology
9.		Apiculture
10.	History	History of Science, Technology, and Medicine in India (HISTM)
11.	Botany	Gardening and Vermicomposting
12.		Herbarium Preparation
13.	Computer Science/ BCA	Internet and Ethical Practices
14.	Physics	Nano Materials and Applications
15.	Political Science	Human Rights
16.	Mathematics	Programing on C++
17.	Statistics	Statistical Methods For Scientists And Engineers (NPTEL)
18.	Chemistry	Environmental Chemistry
19.	Odia	କଳା ବ. ଶ୍ରୀ ଓ ସାହ. ଚନ୍ଦ୍ର- (Please Refer to Detail Syllabus of Odia)
20.	Education	Educational Thinkers of Modern India
21.	Anthropology	Tribal Geography
22.	Geography	Climatology
23.		Demography

Medical Biotechnology and Molecular Diagnostics

Course Objective:

This course aims to provide solid background in genetic and molecular bases of diseases and the physiopathological mechanisms occurring in human beings in disease states, in order to develop diagnostics and therapeutic strategies.

Learning Outcome:

This course is designed to provide students with basic knowledge of various aspects of biotechnology and its applications specifically in the domains of health Biotechnology including forensic science. By acquiring knowledge from this course, students will be equipped to apply these techniques effectively in their future employment opportunities.

Unit-I

The Advent of Medical Biotechnology, Biotechnology in Medicine: Fundamentals, Biotechnology in Medicine: Advances, Analytical Techniques in Medical Biotechnology

Unit-II

Immunology in Medical Biotechnology, Immunology in Medical Biotechnology, Epigenetics and Medical Biotechnology, Stem Cell Technology in Medical Biotechnology. Molecular methods in Clinical Microbiology, Applications of PCR, RFLP, Hybridization (Nucleic acid base) methods, Immunofluorescent, Immune diagnostic test.

Unit-III

Enzyme Immunoassay- Enzymes available for Enzyme immune assays and conjugation of enzymes: General Idea. Solid phases used in Enzyme Immunoassays. Homogeneous and Heterogenous Enzyme Immunoassays. Enzyme Immune Histochemical Techniques.

Unit-IV

Use of Monoclonal and Polyclonal Antibodies in Enzyme Immunoassays. Introduction and Principles of Forensic Science and Techniques. Forensic Science Laboratory and its Organization and Services. Tools and Techniques in Forensic Science. Injury types, methods of assessing various types of death. Principles of DNA Fingerprinting: Role of satellite DNA, Different types of repetitive sequences in Fingerprinting. Application of DNA Fingerprinting in Forensic media.

Text Books

- ✓ *Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington. B.B. Nanda and R.K. Tiwari.*
- ✓ *S B Primrose, R M Twyman and R W Old (2001). Principles of gene manipulation 6th Edition, S B University Press.*
- ✓ *J. Sambrook and D W Russel (2001). Molecular cloning: A laboratory Manual, Vol-1-3, CSHL.*

- ✓ *Forensic Science in India: A Vision for the Twenty First Century*, Select Publishers, New Delhi (2001).
M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).
- ✓ S.H. James and J.J. Nordby, *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton (2005).

Climatology

Course Objective:

- To introduce Climate, climate change and its implications.
- To explain climate system and heat budget of earth
- To introduce the mechanism and effects of Monsoon
- To provide an understanding of Atmosphere and Hydrosphere and their circulation patterns

Learning Outcome:

- Describe a systematic observation on Climate and implications of climate change.
- Explain the significance of climate and climate change
- Elaborate the heat budget and the mechanism of monsoon
- Evaluate the various circulation patterns of Atmosphere and Hydrosphere and its impact on climate

Unit - I: Climate system and classification and Climate change

Components of the climate system, Climate controlling factors, Climate system response, response rates and interactions within the climate system. Basis of classification; Koppen's classification; Thornthwaite's classification; Brief idea on Types of Climate found in India. Climate forcing and feedbacks,.

Unit - II: Heat budget of Earth and Interactions

Incoming solar radiation, receipt and storage of heat; Heat transformation; Earth's heat budget.

Interactions amongst various sources of earth's heat; Monsoon, its mechanism and its intensity influencing factors; Effects of monsoon.

Unit - III: Atmosphere & Hydrosphere

Stratification of atmosphere and atmospheric circulation; Atmosphere-ocean interaction and its effect on climate; Heat transfer in ocean; Global oceanic conveyor belt and its control on earth's climate; Surface and deep circulation.

Practical

1. Study of distribution of major climatic regimes of India on map.
2. Distribution of major wind patterns on World map.
3. Ocean currents and heat circulation

Text Book:

- ✓ Rudiman, W.F., 2001. *Earth's climate: past and future*. Edition 2, Freeman Publisher.

Suggested Readings:

- ✓ Rohli, R.V. and Vega, A.J., 2007. *Climatology*. Jones and Barlatt.
- ✓ Lutgens, F., Tarbuck, E., and Tasa, D., 2009. *The Atmosphere: An Introduction to Meteorology*. Pearson Publisher.
- ✓ Aguado, E., and Burt, J., 2009. *Understanding weather*.

Health Psychology

Introduction:

Health psychology is a specialty area that focuses on how biology, psychology, behavior and social factors influence health and illness. This course is designed to provide help students to understand how Health Psychology as a specialty within psychology addresses the role of behavioral factors in health and illness. Basic theories, models and applications are also included.

Course Outcomes:

- To help the students understand the issues of Health Psychology and how to address them by the bio-psychosocial model of health and illness.
- To help the students to describe behavioral factors that influence health and illness.
- To guide the students understand about health enhancing behaviors including coping with illness.

UNIT-I: Introduction

- (i) Meaning & Goals of Health Psychology, mind body relationship, Bio medical model vs. biopsychosocial model of health and illness,
- (ii) Nature of stress, cognitive appraisal of stressors, causes and effects of stress, management and coping of stress

Learning Outcomes

- Know the basics of health and illness from the Bio-psychosocial perspectives.

UNIT- II: Health promoting and compromising behaviour

- (i) Health promotion, health habit, role of behavioural factors in disease; yoga, meditation, diet, exercise, prevention strategies (primary, secondary, tertiary)
- (ii) Health compromising behaviour- causes and treatment of obesity, eating disorder, alcohol and smoking. Management of illness: diabetes, heart disease, AIDS, cancer

Learning Outcomes

- Understand the significance of behavioral and psychological correlates of health and illness.
- Understand the importance of health enhancing behavior.

Practical:

- (i) **Coping Strategies:** To assess of the Coping Strategies of 4 college students by Tobin's Coping Strategy Inventory (TCSI)
- (ii) **Sleep Quality:** To assess the Sleep Quality of 4 college students using the Pittsburgh Sleep Quality Index (PSQI)

Text Books:

- ✓ *Taylor, S.E. (2006). Health Psychology (6th Ed.). New York: Tata McGraw Hill*
- ✓ *Brannon and Feist. Health Psychology.*
- ✓ *Swain, S. Applied Psychology, New Vishal Publications, New Delhi*

Reference Books:

- ✓ *Mohanty, N., Varadwaj, K. & Mishra, H.C. (2014). Explorations of Human Nature and Strength:*

Practicals in Psychology, Divya Prakashani, Samantarapur, Bhubaneswar.

✓ *Ogden, J. (2007). Essentials of Health Psychology. McGraw Hill*

Samskrta –Sastra- Paricyah

Unit-I

General Idea about the following Samhitas: Rgveda, Yajurveda, Samaveda and Atharva Veda.

Unit-II

General Idea about the following Upanisadas: Isa, Kena, Katha, Prashna, Munda, Mandukya, Taittiriya, Aitareya, Chandogya and Brhadaranyaka.

Unit-III

General Idea about the following Epics & Puranas: Ramayana, Mahabharatam and 18 Mahapuranas

Unit-IV

General Idea about the following Kavyas: Haravijayam, Buddhacaritam, Saundaranandam, Raghvamsam, Kumarasambhavam, Kiratarjuniyam, Sisupalavadham, Naisadhiyacaritam, Meghadutam, Vasavadatta, Kadambari, Harshacaritam, Dasakumaracaritam, Abhijnanasakuntalam, Pancatantram and Hitopadesah.

Core Readings:

- ✓ *History of Sanskrit Literature, A.A. Macdonell, MLBD, Delhi, 2003*
- ✓ *Samkrta Sahitya ka Itihasa, Baladev Upadhyaya, Sarada Niketan, Varanasi*

Suggested Readings:

- ✓ *Samkrta Sahityara Itihasa, H.K. Satapathy, Kitab Mahal, Cuttack.*

Crime and Society

Crime is an integral and normal feature of human society. However, present-day societies witness an eruption of distinct crimes which were neither known nor so rampant in the past. Similarly, the socio-economic milieu from which criminals are drawn today is not the same as they were in the past. Further, with the advances in our knowledge of crime causation, a significant shift in our approaches to crime control and prevention has been increasingly visualized. Correction has emerged as an important alternative to punishment. Hence the relevance of the course on crime and society is inevitable.

Course outcomes:

- Students can visualize the changing profile of crime and criminals in the contemporary society.
- The students can demonstrate knowledge about theoretical perspectives on crime
- Get sensitized with social causes and consequences of crimes and the measures to control crime as well.
- To prepare themselves for professional roles in assuming criminal justice, criminal administration system and reformative institutions

Unit I: Meaning and Concepts of Crime and Delinquency

- 1.1 Crime and Society - An Introduction
- 1.2 Meaning and Characteristics
- 1.3 Typology of Crimes: Conventional, Organized, Political, Cyber, White-collar Crime
- 1.4 Delinquency: Meaning and Nature

Learning outcome:

- After going through the unit, the students can reflect upon the meaning, characteristics, typology of crime along with the concept of delinquency.

Unit II: Theories of Crime

- 2.1 Classical theory
- 2.2 Differential Association Theory
- 2.3 Delinquent Subculture theory
- 2.4 Anomic Theory and Labeling theory

Learning outcome:

- This unit aims to impart the fundamental sociological theories of crime to the students focusing on classical theory, differential association theory, delinquent subculture theory, anomic theory and labeling theory.

Unit III: Changing Profile of Crime and Criminals

- 3.1 Victimology and Juvenile delinquency and crime.
- 3.2 Theories of Punishment: Retributive Theory
- 3.3 Deterrent Theory &
- 3.4 Reformatory Theory

Learning outcome:

- After reading this unit, the students can demonstrate the changing profile of crime and criminals from a sociological perspective.

Unit IV: Correctional Measures:

- 4.1 Nature and significance of correctional measures
- 4.2 Community-based measures
- 4.3 Prison-based measures
- 4.4 Changes in Probation, Parole, Open Prison

Learning outcome:

- After going through the unit, the students can provide an in-depth understanding of various legal and

- extra-legal corrective measures of crime like prison, parole, probation and community-based measures.

Lesson Plans:

Unit	Thrust area	Teaching methods	Total number of classes required	References
I	Meaning, definition, concepts related to crime and its Characteristics, Typology of Crimes: Conventional, Organized, Political, Cyber, White-collar	Lecture and tutorial class	15	Ahuja, Ram. (2015). Criminology. Jaipur: Rawat Publication. Chapter-1
	Crime, Delinquency: Meaning and Nature			
II	Major theories of Crime: Classical theory, Differential Association Theory, Delinquent Subculture theory, Anomic Theory and Labeling theory.	Lecture and tutorial class	15	Marsh, I., Melville, G., Morgan, K., Norris, G., & Walkington, Z. (2007). Theories of crime. Routledge. Chapter-4 Swayamprabha, Theories of criminal behaviour https://www.youtube.com/watch?v=FthBlnS0A-8 Swayamprabha sociological theories of crime https://youtu.be/In_q1LcZDms?si=1zv0jvew-yAsPTRs
III	Changing Profile of Crime and Criminals: Victimology and Juvenile delinquency and crime, Theories of Punishment: Retributive Theory, Deterrent Theory & Reformatory Theory	Lecture and tutorial class	15	Mohanty, Rabindra K. & Mohanty, Satyajit. (2015). Textbook of criminology penology and victimology. New Delhi: Himalaya Publishing House. CEC UGC-03, Changing profile of crime and criminals. https://www.youtube.com/watch?v=YDV90hlYepc

IV	Correctional Measures: Nature and significance of correctional measures, Community-based measures, Prison-based measures, Changes in Probation, Parole, Open Prison	Lecture and tutorial class	15	Ahuja, Ram. (2015). Criminology. Jaipur: Rawat Publication. Swayamprabha, Criminal justice system-01 https://www.youtube.com/watch?v=X0zbinGSjpU Swayamprabha, Criminal justice system-02 https://www.youtube.com/watch?v=arxB2rqMo0A
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Text books:

- ✓ Ahuja, Ram. (2015). Criminology. Jaipur: Rawat Publication.
- ✓ Mohanty, Rabindra K. & Mohanty, Satyajit. (2015). Textbook of criminology penology and victimology. New Delhi: Himalaya Publishing House.

References:

- ✓ Marsh, I., Melville, G., Morgan, K., Norris, G., & Walkington, Z. (2007). Theories of crime. Routledge.
- ✓ Merton, R.K. (1968). Social theory and social structure. New York: The Free Press.
- ✓ Ministry of Home Affairs. (1998). Crime in India. New Delhi: Government of India.
- ✓ Sutherland, E. H., Cressey, D. R., & Luckenbill, D. F. (1992). Principles of criminology. Altamira Press.

e. Resources:

1. CEC UGC-03, Changing profile of crime and criminals.
<https://www.youtube.com/watch?v=YDV90h1Yepc>
2. Crime and Society Swayamprabha
https://onlinecourses.swayam2.ac.in/cec19_hs08/preview
1. Meaning and types of crime, Juvenile delinquency—causes and consequences, theories of punishment (Odisha State Open University)
<https://drive.google.com/file/d/1y0uh8Qjqcadr4oh8cmK79rMb1rdEWGvJ/view>
2. Swayam Prabha crime and delinquency https://youtu.be/mW1gu5f_0cc?si=B1HX1vdnSzyX97IB
3. Swayamprabha sociological theories of crime https://youtu.be/In_q1LcZDms?si=1zv0jvew-yAsPTRs
4. Swayamprabha, Criminal justice system-01
<https://www.youtube.com/watch?v=X0zbinGSjpU>
5. Swayamprabha, Criminal justice system-02
<https://www.youtube.com/watch?v=arxB2rqMo0A>

Sample Question

Answer all questions of the given Part-I, II, III & IV

Part-I

I. Answer all questions of the following. Marks $1 \times 12 = 12$
Q. Phishing is a _____ crime.

Part-II

2. Write any eight questions within two or three sentences each. Marks $8 \times 2 = 16$
Q. What is delinquency?

Part-III

3. Answer any eight questions within 75 words each. Marks $8 \times 3 = 24$
Q. Write a note on white-collar Crime.

Part-IV

4. Answer all of the following with 500 words each. Marks $7 \times 4 = 28$
Q. Critically examine the significance of Differential Association theory of crime.

Professional Writing

Course Objectives

- The course aims at teaching students to write grammatically correct, clear, effective prose and applies it to writing for the workplace.
- Its objective is to help students develop writing skills and acquire the knowledge to apply these skills in standard workplace document formats.
- It includes a study of writing in a variety of professional contexts with an emphasis on assessing rhetorical situations and crafting messages to inform and persuade diverse audiences in a variety of forms and formats.

Unit-1

Writing: Definition and Requirement

Writing Process: Prewriting, Writing and Post writing

Basic Writing Skills

Plain English

Unit-2

Genres of Writing: Persuasive, Expository, Narrative, Descriptive and Argumentative

Unit-3

Basic forms: Letters, Application, Memo, Notices and Minutes

Raising the Bar: Presentations, Proposal, and Report

Unit-4

The Elements of Style: Grammar, Usage, and Mechanics

Prescribed Texts

- ✓ *The Craft of Professional Writing*, Second Edition by Michael S. Malone
- ✓ *Literature and Art of Communication*. Parhi, Pati, Mohol et al. Cambridge University Press, 2019.
- ✓ *Professional Writing Skills: A Write It Well Guide* by Natasha Terk

Suggested Readings

- ✓ *Huddleston R., and Geoffrey K. Pullum, eds. A Student's Introduction to English Grammar. CUP.2005*
- ✓ *MLA Handbook for Writers of Research Papers. Eighth edition. Modern Language Association of America. 2021*
- ✓ *Excellence In Business Communication by John V. Thill and Courtland L. Bovee*
On Writing Well by William Zinsser

<https://communicationprogram.wharton.upenn.edu/library/>

<https://www.osou.ac.in/eresources.php>

Indian Economy and Society

Course Description

- This course aims to provide an overview of the contemporary discussions on economy, policy, gender and labour issues and environmental issues. This course will serve as a general studies paper for many competitive examinations and keep the student updated with the contemporary socio-economic issues. The course is multi-disciplinary one covering economics, political sciences, sociology and environmental sciences.

Course Outcomes

- To gain the basic ideas on the Indian Economy, Indian political system, environmental concerns, gender perspectives, and issues of labour rights.
- To understand the growth of the Indian Economy and its sectoral composition.
- To know the distribution of powers between centre state and local governments; and the role of finance commissions in transferring funds to PRIs and ULBs.
- To familiarise and sensitize students about gender concerns and labour rights issues, besides the environmental concerns, and national and global initiatives to halt the degradation of the environment.

Unit I: Macroeconomic scenario: GDP Growth and Sectoral composition

- India's GDP growth in recent years. Contribution of Agriculture and allied activities, Industry and service sectors to GDP and growth of these sectors in the recent years. Major government initiatives taken by the government to strengthen the economic growth and sectoral growth.
- *LO: This module will educate the students on India's recent scenarios of GDP growth, sectoral composition, and government initiatives to strengthen economic growth.*

Unit II: Indian polity: Centre and state relation, role of PRIs and ULBs

- Division of power between centre and states: Union List, State list and Concurrent list. Major expenditure obligations and revenue raising abilities of the Union and the state government. 73rd and 74th Constitutional amendments PESA. Status of State Finance Commissions and devolution of functions .functionaries and funds to PRIs and ULBs in India
- *LO: This module will educate the students on the distribution of powers between unions, states, and local governments and the status of state finance commissions in the devolution of funds to Panchayat Raj Institutions and Urban Local Bodies.*

Unit III: Gender and Labour issues:

- The ideas of Gender. Gender, work and organisation: accounting women's work; impact of policies of globalization on women's work; gender inequality and labour force participation; gender justice and human rights
- Labour Market: wage employment vs self-employment; wage differentials; skill mismatch and productivity; reasons for declining labour share in national income, social security and labour welfare; Labour market regulations and its impact on employment
- *LO: This module will educate students about the basic concepts of gender-related issues, and labour rights.*

Unit IV: Environmental Concerns:

- Threats of climate change and actions: Observed Changes, Impacts, and attribution; Responses undertaken to date. Current mitigation and adaptation actions, and Policies are not sufficient; Understanding Net Zero CO2 and Net zero GHG emissions.
- *LO: This module will sensitize the students about the threats of climate change, mitigation, adaptation, and commitment of nations to achieve Net Zero emissions.*

Basic Readings:

- ✓ For Module I please refer to Economic Survey of India latest year
- ✓ For Module II please refer to the 7th Schedule of the Indian Constitution and Latest Finance Commission of India Report, Chapter on local governments
- ✓ For Module III:
 - (a) Government of India (1974), Towards Equality : Report of the Committee on the Status of Women in India, Dept. Of Social Welfare, Ministry of Education and Social Welfare
 - (b) Mazumdar, Vina (1983), Women, Work and Employment: Struggle for a Policy, ICSSR, New Delhi
 - (c) Borjas, George J. Labor Economics. 5th ed. Boston, MA: McGraw-Hill/Irwin, 2010
 - (d) Orley Ashenfelter, Richard Layard, David E. Card (1986), Handbook of labor economics, 1st Edition, North-Holland
- ✓ For Module IV please refer to the Section 2 of Synthesis Report of The IPCC Sixth Assessment Report (AR6) longer Report IPCC_AR6_SYR_LongerReport.pdf

Fundamentals of Entrepreneurship and E-Commerce

Course Objectives:

The course aims to

- Understand the basic concepts and theories of entrepreneurship.
- Identify and evaluate business opportunities in the digital economy.
- Develop skills in creating effective business plans and strategies.
- Gain knowledge of e-commerce platforms and technologies.
- Learn digital marketing techniques for online businesses.
- Understand the legal and ethical considerations in e-commerce.
- Develop critical thinking and problem-solving skills relevant to entrepreneurship and e-commerce.

Course Outcomes

After completion of the course, learners will be able to:

- Understand Entrepreneurship Concepts and Identify Business Opportunities.
- Navigate Legal and Ethical Considerations for E-Commerce Platforms.
- Implement Digital Marketing Strategies.
- Manage and Analyze E-Commerce Performance.
- Develop Growth Strategies.

Unit-1: Introduction to Entrepreneurship

Definition of entrepreneurship, Characteristics of successful entrepreneurs, Importance of entrepreneurship in the economy, Types of entrepreneurship. Opportunity Recognition and Idea Generation; Identifying business opportunities, Idea generation techniques, Market research and analysis, Identifying target markets and customer segments.

Unit-2: Business Planning

Components of a business plan, Writing an executive summary, Marketing plan development, Financial projections and budgeting. Legal and Ethical Considerations; Legal structures for businesses, Intellectual property rights, Ethical considerations in entrepreneurship, Corporate social responsibility.

Unit-3: Introduction to E-Commerce

Definition and scope of e-commerce, Evolution of e-commerce, Types of e-commerce models (B2B, B2C, C2C), E-commerce platforms and technologies. Building an E-Commerce Website; Website design principles, Choosing a domain name and hosting provider, Payment gateways and security, User experience optimization. Digital Marketing for E-Commerce; Search engine optimization (SEO), Pay-per-click (PPC) advertising, Social media marketing, E-mail marketing.

Unit-4: E-Commerce Logistics and Fulfilment

Order processing and fulfilment, Inventory management, Shipping and delivery options, Returns and customer

service. E-Commerce Analytics and Performance Measurement; Key performance indicators (KPIs) for e-commerce, Web analytics tools, Customer feedback and reviews. Scaling and Growth Strategies; Scaling an e-commerce business, International expansion, Strategic partnerships and collaborations, Exit strategies: mergers, acquisitions, IPOs

Case Studies: Analysis of successful e-commerce ventures

Suggested Readings

- ✓ *Singh, K. (2008). Rural Development - Principles, Policies, and Management. New Delhi: Sage Texts.*
- ✓ *Samanta, R. K. (2000). New Vista in Rural Development Strategies & Approaches. Delhi: B.R. Publishing Corporation.*
- ✓ *Hussain, T., Tahir, M., & Tahir, R. (2017). Fundamentals of Rural Development. New Delhi: I. K. International Publishing House Pvt. Ltd.*
- ✓ *Sahu, B. K. (2003). Rural Development in India. New Delhi: Anmol Publications Pvt. Ltd.*
- ✓ *Dutta, S. K., & Ghosh, D. K. (2002). Empowering Rural Women. New Delhi: Akansha Publishing House.*
- ✓ *Dutta, S. K., & Ghosh, D. K. (2006). Institutions for Development: The case of Panchayats. New Delhi: Mittal Publications.*
- ✓ *Agarwala, K. N., Lal, A., & Agarwala, D. (2000). Business on the Net: An Introduction to the whats and hows of E-commerce. Noida, Uttar Pradesh: Macmillan Publishers India Limited.*
- ✓ *Awad, E. M. (2009). Electronic Commerce from vision to fulfillment. Delhi: PHI Learning.*
- ✓ *Bajaj, K. K., & Debjani, N. (2005). E-Commerce. New Delhi: Tata McGraw Hill Education.*
- ✓ *Chhabra, T. N., Jain, H. C., & Jain, A. An Introduction to HTML. Delhi: Dhanpat Rai & Co.*
- ✓ *Dietel, H. M., Dietel, P. J., & Steinbuhler, K. (2001). E-Business and E-commerce for Managers. New Jersey: Prentice Hall.*
- ✓ *Diwan, P., & Sharma, S. (2002). Electronic commerce- A Manager's Guide to E-Business. Delhi: Vanity Books International.*
- ✓ *Kosiur, D. (1997). Understanding Electronic Commerce. New Delhi: Prentice Hall of India Pvt. Ltd.*
- ✓ *Turban, E., King, D., Lee, J., Warkentin, M., Chung, H. M., & Chung, M. (2002). Electronic Commerce: A Managerial Perspective. New Jersey: Prentice Hall Publishing.*
- ✓ *Whiteley, D. (2000). E-Commerce: Strategy, Technologies and Applications. New York: McGraw Hill.*

Vector Borne Diseases and Epidemiology

Prorogram Outcomes

- The multidisciplinary programme is incorporated for the students to acquire the knowledge on various vector borne disease and their outbreak.
- The students will learn about role of various insects in causal behaviour towards disease manifestation.
- The target learners will be able to understand the concept of disease outbreak, spread and epidemiology.

Course Outcomes:

- Student will be able to understand the concepts of vector borne disease, vectors and host-vector relationship with specificity and their various modes of transmission.
- Target population will learn the types of insect vectors and disease caused by them.
- Students will be able to gain the knowledge on objectives and core functions of epidemiology.
- Students will gain the in-depth knowledge on epidemiological parameters like communicable and non-communicable disease and about their control measures.

Learning Outcomes:

- Knowledge gain on principles and concepts of vector borne disease.
- Student will be well acquainted with the various types of vectors for causal and spread of disease.
- Learners will be able to disseminate the gained knowledge on epidemiological functions and significant role in public health management system.
- Students will be able to distinguish and initiate control measures towards various types of communicable and non-communicable diseases.

Unit 1: Insects, Concept of Vectors, Insects as Vectors

General Features of Insects, Morphological features, Head – Eyes, Types of antennae, Mouth parts with reference to feeding habits, Brief introduction of Carrier and Vectors (mechanical and biological vector), Reservoirs, Host-vector relationship, Vectorial capacity, Adaptations as vectors, Host Specificity, Classification of insects up to orders, detailed features of orders with insects as vectors – Diptera, Siphonaptera, Siphunculata, Hemiptera.

Unit 2: Vectors and diseases

Important insect vectors – Mosquitoes, Sandfly, Houseflies; Study of mosquito-borne diseases – Malaria, Dengue, Chikungunya, Viral encephalitis, Filariasis; Control of mosquitoes, Study of sand fly-borne diseases – Visceral Leishmaniasis, Cutaneous Leishmaniasis, Phlebotomus fever; Control of Sandfly, Study of house fly as important mechanical vector, Myiasis, Control of house fly

Unit 3: Epidemiology-an introduction

Definition, Objective and uses and core functions of epidemiology, Epidemiologic approach, Historical evolution of epidemiology, Concept of health and disease, Determinants of health and diseases, Difference between epidemiology and clinical/preventive medicine, Epidemiology as the cornerstone of public health/health - for example: contribution of Nurses' Health study, British Doctors' study and Framingham

Heart Study to public health etc.

Unit 4: Disease types, mode of transmission and management

Difference between infectious and communicable diseases vs. non communicable diseases, Natural history of disease, Chain of infection, Mode and route of transmission of diseases, Meaning of outbreak or epidemic, endemic and pandemic, incubation period, latency period, clinical case, subclinical case, carrier, infectivity, pathogenicity and virulence, theories and principles of causation- epidemiological triad, web of causation, Bradford Hill criteria and Rothman's Causal pies, levels of prevention and modes of intervention.

Text Books

- ✓ Mathews, G. (2011). *Integrated Vector Management: Controlling Vectors of Malaria and Other Insect Vector Borne Diseases*. Wiley-Blackwell
- ✓ Chapman, R.F. (1998). *The Insects: Structure and Function*. IV Edition, Cambridge University Press, UK.

Suggested Readings

- ✓ Mike Service (2012) *Medical Entomology for Students* Cambridge University Press; 5th edition.
- ✓ Pedigo L.P. (2002). *Entomology and Pest Management*. Prentice Hall Publication
- ✓ Understanding the fundamentals of Epidemiology- An evolving text. Victor Schoenback and Wayne B. Rosamond (2000).
- ✓ Modern Epidemiology- Kenneth Rothman, Sebastien Haneuse, Timothy L. Lash, Tyler J. VanderWeele (2021). Bisht D.S., Apiculture, ICAR Publication.
- ✓ Chaudhuri S. 2017. *Economic Zoology*. Kolkata: New Central Book Agency Pvt. Ltd.
- ✓ Chun and Chen Da-Chung; 1988 *Silkworm Rearing*; Pub. By FAO, Rome.
- ✓ Cramp D. 2012. *The Complete Step by Step Book of Beekeeping*. Anness Publishing.
- ✓ Econ Handbook of Silkworm Rearing: Agriculture and Technical Manual-1, Fuzi Pub. Co. Ltd.,
- ✓ Jolly, M. S: *Appropriate Sericultural Techniques*
- ✓ Krishnaswamy, *Improved Method of Rearing Young age silkworm*; 1986 S., Bangalore
- ✓ Mathews G. 2011. *Integrated Vector Management: Controlling Vectors of Malaria and Other Insect Vector Borne Diseases*. Wiley-Blackwell
- ✓ Narasimhanna MN. 1988. *Manual of Silkworm Egg Production*; CSB, Bangalore.
- ✓ Prost PJ. 1962. *Apiculture*. Oxford and IBH, New Delhi.
- ✓ Rangaswami G. 1976. *Manual on Sericulture*; Food and Agriculture Organisation, Rome
- ✓ Sarkar S; Kundu G & Chaki K C - *Introduction to Economic Zoology*; NCBA, Kolkata
- ✓ Sengupta, K, ;1989 *A Guide for Bivoltine Sericulture*
- ✓ Singh S. *Beekeeping in India*, Indian council of Agricultural Research, New Delhi.
- ✓ Ullal SR, Narasimhanna MN. *Handbook of Practical Sericulture*; CSB, Bangalore

Gardening and Vermicomposting

Course Objectives:

- To introduce the students with the concept and importance of horticulture.
- To introduce the students with the methods for plant propagation.
- To introduce the students with the scope and importance of vermicomposting.

Course Outcomes:

- Students would understand the scope and importance of the horticulture.
- Students would get the skill to propagate the plants through asexual methods.
- Students would understand the importance and use of vermicomposting for horticulture.

Unit-I: Introduction to horticulture, importance of horticulture crops, Principle of cop production technology, essential plant nutrients and their deficiency symptoms, organic and inorganic manures, water management in horticulture crops

LO: *The students will know about the concept and importance of horticulture.*

Unit-II:

Types of plant propagation, root curing and tubers, grafting, leaf cutting, runners and offsets, rooting media, rooting hormone, types of nursery bed, irrigation & protection

LO: *The students will be able to know how to do the plant propagation.*

Unit-III: Vermiculture: Definition, scope and importance; vermicomposting using garden waste; use of vermicomposting in garden

LO: *The students will be able to know and how to use the vermicomposting.*

Practicals:

1. Identification and description of salient features of ornamental plants
2. Study of asexual propagation methods (grafting, cutting, layering)
3. Study of techniques for rooting
4. Study of irrigation techniques (drip irrigation)
5. Study of preparation of nursery bed.

Text Books:

✓ Rao, K. M. (2005). *Textbook of horticulture*. Macmillan.

Reference book:

✓ Don, M. (2021). *The Complete Gardener: A Practical, Imaginative Guide to Every Aspect of Gardening*. Dorling Kindersley Ltd.

✓ Solankey, S. S., Akhtar, S., Maldonado, A. I. L., Rodriguez-Fuentes, H., Contreras, J. A. V., & Reyes, J. M. M. (Eds.). (2020). *Urban Horticulture: Necessity of the Future*. BoD—Books on Demand.

Herbarium Preparation

Course Objectives:

- To introduce the basics of herbaria and herbarium specimens.
- To educate on the methods for preparation and handling of specimens and materials.
- To know the methods of collection, processing and storage of herbarium specimens.
- To learn about the range of application of herbaria in plant taxonomy.

Course Outcomes:

- The students shall have a basic knowledge on the herbaria and herbarium specimens.
- The students shall get the opportunities to learn the basics specimen processing and proper storage for use.
- The students shall be able to understand the range of application of the herbaria and herbarium specimens.
- The students would be able to learn the application of modern tools for information collection, storage and sharing.

Unit-I: LO: The learners shall gain knowledge on the importance of herbarium in plant taxonomy.

- Herbaria: Introduction, history and objectives; Types of herbaria; role of herbaria in teaching, and research; important herbaria of India and the world.
- Herbarium specimen - types and diversity- loose seeds, dried and bulky fruits, algae, fungi, wood sections, pollen, microscope slides, silica-stored materials, DNA extractions, and fluid-preserved flowers or fruits; use of specimens. Plant collections and maintenance of live specimen.

Unit-II: LO: The learners shall gain knowledge and skills on the preparation and processing of herbarium specimens.

Herbarium methodology: Collection, field notes; Processing of specimen-poisoning, pressing, drying, mounting, stitching, identification and arrangement. Methods to address specimen diversity - Algae, fungi, and bryophytes; methods of their collection, processing and preservation.

Unit-III: LO: The students shall be able to understand the long-term storage, and use of specimen as well as on the procedure for data and knowledge sharing in the field.

Maintenance and curing of specimen, materials and illustrations-moisture management, heating, chemical treatments, fumigation. Handling of Specimen; library and special collections; exchange of specimens. Use of computer, databases and webs - Local and global databases; Herbaria for outreach activities - services, education, plant identification and conservation.

Practical:

1. Field survey and collection of plant materials
2. Methods of pressing and drying

3. Drying of materials by using chemicals- alcohol, glycerol, formaldehyde, FAA
4. Preservation of materials-moist and dried
5. Mounting, labelling and cataloguing of herbarium specimen
6. Use of computers for herbarium cataloguing and management
7. Seed collection and storage

Text book:

- ✓ *E. Amodu (2017). Field Herbarium Techniques, Lambert Academic Publishers.*

Reference Book:

- ✓ Specimen preparation guide-University of Florida Herbarium -(FLAS)-2023
- ✓ Sanwal et al. (2020). Introduction to procedures for preparation of herbarium specimen, NBPGR, - New Delhi
- ✓ Victor J, et al (2004). Herbarium essentials – The southern African herbarium user manual. SABD Network Report.

Human Rights Education

Course Outcomes (COs):

On completion of this course, the learners will be able to:

- Explain the concept and historical evolution of human rights.
- Understand relationship between rights and duties.
- Identify the major international declarations, treaties and covenants governing human rights.
- Summarize the constitutional provisions with regard to fundamental human rights and duties.
- Recognize the importance of various human rights documents
- Exhibit skills for human rights advocacy and lawful protests.

UNIT I: Human Rights and Duties

LO: *Understand human rights and duties.*

- Concept of human rights and duties, concepts of liberty, equality, fraternity and justice
- Classifications of human rights and duties
- Interrelationship of rights and duties.

UNIT II: Constitutional Perspective

LO: *Understand growth and evolution of human rights in both national and international perspectives.*

- Historical evolution of human rights.
- United Nations for Promotion of Human Rights- - Economic and Social Council, ILO, UNESCO, WHO, FAO.
- Human Rights and Duties in India- Fundamental Rights, Directive Principle of State Policy, Fundamental Duties.

UNIT III: Society and Human Rights

LO: *Understand special rights of women and children.*

LO: *Explain roles of NGOs and education in promoting human rights.*

- Rights of Women- physical assault and sexual harassment, domestic violence, violence at work place, remedial measures.
- Rights of Children- child labour, role of trade union in protecting the rights of labourers.
- Role of NGOs and mass media, role of education.

UNIT-IV: Transaction of Human Rights Education

LO: *Explain how human rights can be promoted.*

LO: *Sensitize to the needs of human rights through field visits.*

- Methods of teaching human rights-drama and role play, brainstorming, discussion, seminars and workshops, projects.

- Becoming peace teacher – acquisition of relevant knowledge, attitudes, values and skills.
- Visits to orphanage and old age home, celebration of international days, collecting and displaying human rights materials on bulletin board and organizing debate.

Sample Questions

1. What do you mean by Human Rights? (1 Mark)
2. Mention any two types of Human Rights. (2 Marks, Within 50 words)
3. Discuss the role of NGOs and Mass Media in promotion of human rights.(5 Marks, Within 300 words)
4. Give an account of Rights of women and violence at work place with suitable examples. (8 Marks, Within 500 to 800 words).

Mode of Course Transaction: Seminar, Team Teaching, Dialogue, Peer-Teaching, Collaborative and Cooperative Learning, Field Trip, Concept Mapping, Self-Learning

Suggested Activities

Each student will be required to prepare and submit a report on any one of the following:

- Review a secondary class textbook and find out chapters relating to human rights education. Prepare report.
- Organise an awareness in camp on any social issue and prepare report.
- Find out the Constitutional provisions on human rights and duties in India. Write a report by comparing it with other Constitutions.
- Identify a case of child labour/domestic violence or any other social issue in your locality and write a report.

Text Books

- ✓ *Sergio, B. and Ghosh, S. (2009). Teaching of Human Rights. New Delhi: Dominant Publishers and distributors.*
- ✓ *Das, A.K. and Mohanty, P.K.(2007). Human Rights in India. New Delhi: Sarup and Sons.*

Reference Books

- ✓ *Meena, P.K.(2008). Human Rights: Theory and Practice. New Delhi: Murali Lal and Sons.*
- ✓ *Nirmal, C. J. (2002, ed.), Human Rights in India: Historical, Social and Political Perspective. Oxford University Press.*
- ✓ *GUPTA, D.N. and Singh, S. (2003). Human Rights Acts, Statutes and Constitutional Provisions. Kalpaz Publications.*
- ✓ *Agarwal, H. O.(2018). Human Rights. Central Law Publications.*

Web Resources

- <https://www.tandfonline.com/journals/fjhr20#:~:text=The%20International%20Journal%20of%20Human%20Rights%20covers%20an%20exceptionally%20broad,%2C%20class%2C%20refugees%20and%20immigration.>

- https://link.springer.com/journal/12142?gad_source=1&gclid=Cj0KCQjwudexBhDKARIaI-GWYVe89d-w2M5Rx6rS6zd81AuBNIDZ7o2uCNox5wiC8v_baX_2QZxTe4aAtgyEALw_wcB

Internet and Ethical Practices

Course Objectives:

- To learn about different Internet services
- To understand the security and ethical issues in the use of Internet

Learning Outcomes:

Upon completion of this course, students will be able to:

- Understand Internet and World Wide Web
- Understand about the security issues and use of cryptographic methods
- Know about the security challenges in e-commerce
- Know about the growing security concerns in the cyberspace and legal perspectives to ensure ethical use of Internet

UNIT-1:

Data Communication over Internet, connecting to the Internet, broadband, leased connection, WWW, Web browsers, URL, HTTP, Blogs, Search engines, e-mail services, teleconferencing, social networks, online services,

UNIT-2:

Network Security and Cryptography: Cryptography, Cryptography terminologies, CIA, Security goals, Attacks, Security services, Types of cryptography-symmetric and asymmetric key cryptography (basics only), Cryptanalysis, Steganography.

UNIT-3:

Security issues in E-Commerce: Types of E-Commerce models (B2B, B2C, C2B, C2C), EFT (Electronic Fund Transfer), Modes of EFT, Online Payment and The IT Act 2000, IPR in Cyberspace.

UNIT-4:

Security Challenges in Cyberspace: Hacking, Child Pornography, Cyber Stalking, Denial of service, Malware, Phishing, Classification of cyber-crimes, Common cyber-crimes, cyber-crime targeting computers and mobiles, cyber-crime against women and children, financial frauds, social engineering attacks, Legal perspective of cyber-crime, Organizations dealing with Cyber-crime and Cyber security in India.

Text Books:

- ✓ *Computer Fundamentals and Applications, Ashok Arora, Vikas Pubs.*
- ✓ *Cryptography and Network Security, Behrouz A. Forouzan, Debdeep Mukhopadhyay*

Reference Books:

- ✓ *Henry Chan, Raymod Lee and et al., “E-Commerce Fundamental and Applications”, Wiley*
- ✓ *C. P. Pfleeger, S. L. Pfleeger, Security in Computing, Prentice Hall of India.*

Nano Materials and Applications Theory

Course Outcomes

- Basic understanding of nanostructured shape, application of Schrodinger equation in nanostructured
- Understanding of nanomaterial synthesis
- Understanding of nanomaterials different Characterization
- Understanding of different optical properties of nanomaterials
- Apply the above concepts in Experiments

UNIT 1: NANOSCALE SYSTEMS:

- Length scales in physics, Nanostructures: 1D, 2D and 3D nanostructures (nano dots, thin films,
- nanowires, nano rods), Band structure and density of states of materials at nanoscale, Size Effects in
- nano systems, Quantum confinement: Applications of Schrodinger equation- Infinite potential well,
- potential step, potential box, quantum confinement of carriers in 3D, 2D, 1D nanostructures and its
- consequences. (10 Lectures)

UNIT 2: SYNTHESIS OF NANOSTRUCTURE MATERIALS

- Top down and Bottom up approach, Photolithography. Ball milling. Gas phase condensation. Vacuum deposition.
- Physical vapor deposition (PVD): Thermal evaporation-beam evaporation, Pulsed Laser deposition.
- Chemical vapor deposition (CVD). Sol-Gel. Electro deposition. Spray pyrolysis. Hydrothermal synthesis.
- Preparation through colloidal methods. MBE growth of quantum dots. (8 Lectures)

UNIT III : CHARACTERIZATION:

- X-Ray Diffraction. Optical Microscopy. Scanning Electron Microscopy.
- Transmission Electron Microscopy. Atomic Force Microscopy. Scanning Tunneling Microscopy. (8 Lectures)

UNIT IV: OPTICAL PROPERTIES:

- Coulomb interaction in nanostructures. Concept of dielectric constant
- for nanostructures and charging of nanostructure. Quasi-particles and excitons. Excitons in direct and
- indirect band gap semiconductor nanocrystals. Quantitative treatment of quasi-particles and excitons,
- charging effects. Radiative processes: General formalization-absorption, emission and luminescence.
- Optical properties of heterostructures and nanostructures. (14 Lectures)

Reference books:

- ✓ *C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.).*
- ✓ *S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publishing Company)*
- ✓ *K.K. Chattopadhyay and A. N. Banerjee, Introduction to Nanoscience and Technology (PHILearning Private Limited).*
- ✓ *Richard Booker, Earl Boysen, Nanotechnology (John Wiley and Sons).*
- ✓ *M. Hosokawa, K. Nogi, M. Naita, T. Yokoyama, Nanoparticle Technology Handbook (Elsevier, 2007).*
- ✓ *Bharat Bhushan, Springer Handbook of Nanotechnology (Springer-Verlag, Berlin, 2004).*

LABORATORY: 1 credit

1. Synthesis of metal nanoparticles by chemical route.
2. Synthesis of semiconductor nanoparticles.
3. Surface Plasmon study of metal nanoparticles by UV-Visible spectrophotometer.
4. XRD pattern of nanomaterials and estimation of particle size.
5. To study the effect of size on color of nanomaterial.
6. Growth of quantum dots by thermal evaporation.
7. Fabricate a thin film of nanoparticles by spin coating (or chemical route) and study transmittance spectra in UV-Visible region.

Reference Books:

- ✓ C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.).
- ✓ S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publishing Company).
- ✓ K.K. Chatopadhyay and A.N. Banerjee, Introduction to Nanoscience & Technology (PHILearning Private Limited).
- ✓ Richard Booker, Earl Boysen, Nanotechnology (John Wiley and Sons).

Human Rights

Course Objectives:

The course on Human Rights aims to provide a comprehensive understanding of the concept, evolution, and theoretical foundations of human rights, emphasizing their significance in contemporary society. It explores the historical development of human rights and examines various theories, including Natural, Legal, Utilitarian, and Marxist perspectives, to enable students to make broad examination of issues and policies taking into account diverse perspectives. The course delves into the universality of human rights amidst cultural diversity and assesses key international human rights instruments such as the Universal Declaration of Human Rights and subsequent international covenants and protocols. The course seeks to enable students to critically analyse the role of major international institutions like the UN, UNHRC, and UNOHCHR and their functions in promoting and protecting human rights. The course addresses contemporary issues and multidimensional threats to human rights to sensitize students on human rights issues in the local contexts. In the Indian context, it highlights the foundational principles of human rights, the institutional frame works along with the role of NGOs and civil society in human rights movements. Through this course, students will gain critical insights and analytical skills necessary to understand and address human rights challenges globally and within India.

Expected Learning Outcome:

After the completion of this course, the students would be competent in following skills and acquire adequate knowledge on the issues of Human Rights.

Unit I: They would understand the significance of human rights and its evolution over the period of time. Also, they would learn different human right theories and connotation of human rights across cultures.

Unit II: This unit would make them familiarise with international covenants on Human rights; the changing dynamics of state and role of global organisations working for the cause of Human Rights.

Unit III: After learning this unit, they would be aware about the multidimensional nature of human rights violation.

Unit IV: This unit would enlighten the students on Indian perspective of Human rights drawing upon ancient philosophy, Human rights issues in contemporary India, the institutional framework to address the human rights issues.

Unit I: Understanding Human Rights

- a) Connotation of 'Rights'; Meaning, Nature and Significance of Human Rights. Evolution and Historical Development of Human Rights.
- b) Theories of Human Rights: Natural, Legal, Utilitarian and Marxist;
- c) Universality of Human Rights and cultural diversity.

Unit II: International Human Rights

- a) International Covenants on Human Rights: Universal Declaration of Human Rights; International Covenants: Civil and Political Rights-1966, Economic, Social and Cultural Rights 1966; Optional Protocols-1976 and 1989, World Conference on Human Rights: Tehran 1968 and Vienna 1993.
- b) Institutional Framework: UN, UN Human Rights Council (UNHRC), UN office of the High Commissioner for Human Rights (UNOHCHR).
- c) State sovereignty and Human Rights; Human rights activism and role of Global Human Rights Organisations.

Unit III: Contemporary issues and Multidimensional aspect of threats to Human Rights.

- a) Atrocities against Women, Children, SCs, STs, Minorities, Differently abled people.
- b) Impact of Globalisation on Human Rights; Environment and Human rights issue.
- c) Refugee crisis and Migrations, Displacement, Bonded Labour, Custodial abuse, War crimes.

Unit III: Human Rights in India

- a) Underlying Human rights Principles of Indian society: Dharma, Nyaya, Neeti, Ahimsa.
- b) Institutional Framework: Constitutional provisions, NHRC, SHRC; Judicial Activism.
- c) Human Rights Movements in India: Engagement of NGOs and Civil society in Protecting Human Rights.

Essential Readings:

- ✓ Alan, B. (2017). *Human rights and the environment: where next?* In *Challenges in International Human Rights Law* (pp. 765-794). Routledge.
- ✓ Barkin, J. S. (1998). *The evolution of the constitution of sovereignty and the emergence of human rights norms.* *Millennium*, 27(2), 229-252.
- ✓ Beitz, C. R. (2009). *The idea of human rights.* OUP Oxford.
- ✓ Cerna, C. M. (1994). *Universality of human rights and cultural diversity: Implementation of human rights in different socio-cultural contexts.* *Hum. Rts. Q.*, 16, 740.
- ✓ Das, A. K., & Mohanty, P. K. (2007). *Human rights in India.* Sarup & Sons.
- ✓ Donnelly, J., & Whelan, D. J. (2020). *International human rights.* Routledge.
- ✓ Freeman, M. (2022). *Human rights.* John Wiley & Sons.
- ✓ Gready, P. (2004). *Conceptualising globalisation and human rights: boomerangs and borders.* *The International Journal of Human Rights*, 8(3), 345-354.
- ✓ Gudavarthy, A. (2008). *Human rights movements in India: State, civil society and beyond.* *Contributions to Indian Sociology*, 42(1), 29-57.
- ✓ Henkin, L. (1989). *The universality of the concept of human rights.* *The Annals of the American Academy of Political and Social Science*, 506(1), 10-16.
- ✓ Henkin, L. (1995). *Human rights and state sovereignty.* *Ga. J. Int'l & Comp. L.*, 25, 31.
- ✓ Ishay, M. (2008). *The history of human rights: From ancient times to the globalization era.* Univ of California Press.
- ✓ Kennedy, D. (2002). *International human rights movement: Part of the problem?.* *Harv. Hum. Rts. J.*, 15, 101.
- ✓ Kurki, M. (2011). *Human Rights and Democracy Promotion: reflections on the contestation in, and the politico-economic dynamics of, rights promotion.* *Third World Quarterly*, 32(9), 1573-1587.
- ✓ Langlois, A. J. (2002). *Human rights: the globalisation and fragmentation of moral discourse.* *Review of International Studies*, 28(3), 479-496.
- ✓ Merry, S. E. (2009). *Human rights and gender violence: Translating international law into local justice.* University of Chicago Press.
- ✓ Ray, A. K. (2003). *Human rights movement in India: A historical perspective.* *Economic and Political Weekly*, 3409-3415.

- ✓ *Shelton, D. (2006). Human rights and the environment: what specific environmental rights have been recognized. Denv. J. Int'l L. & Pol'y, 35, 129.*
- ✓ *Sripati, V. (2000). India's National Human Rights Commission: A Shackled Commission. BU Int'l LJ, 18, 1.*

Additional Readings:

- ✓ *Cole, W. M. (2005). Sovereignty relinquished? Explaining commitment to the international human rights covenants, 1966-1999. American sociological review, 70(3), 472-495.*
- ✓ *Nyamu, C. I. (2000). How should human rights and development respond to cultural legitimization of gender hierarchy in developing countries. Harv. Int'l. LJ, 41, 381.*
- ✓ *Oestreich, J. E. (2017). Development and Human Rights: rhetoric and reality in India. Oxford University Press.*
- ✓ *Schmitz, H. P. (2014). Non-state actors in human rights promotion. The SAGE Handbook of Human Rights, 1, 352-71.*

Internet Sources

1. Human Rights Course study materials in MA Political science.
<https://www.distanceeducationju.in/pdf/404%20HUMAN%20RIGHTS.pdf>
2. International Human Rights document, charters etc available at
<https://csometer.info/international-human-rights-documents>
3. Defining Human Rights: Harper Lecture, The University of Chicago.
<https://youtu.be/2nYdTV9wuGI?si=EbZBuZvHR5gg4Q15>
4. Reflections on the Origins of Human Rights (Talal Asad Lecture), Berkeley Centre
<https://youtu.be/Vd7P6bUKAWs?si=K1eG2rwRqvgxjCh6>

Activities to Do

1. Students should be encouraged and facilitated to visit NHRC or SHRC office to learn the functioning of the commission.
2. Conduct lecture on contemporary issues on Human rights in India.
3. Arrange a movie session for the students on issues of Human Rights. Movies like 13th (2016), The Whistleblower (2010), Mandela: Long Walk to Freedom (2013), Jai Bhim (2021).
4. Conduct community outreach programmes to spread awareness on Human Rights Day.

PROGRAMMING IN C++

Course Objective:

The objective of the course is to learn the basics about C++ programming language such as variables, data types, arrays, pointers, functions and classes etc. On successful completion this course, students will acquire a good understanding about the concept of object-oriented programming using C++ and be able to write and read basic C++ code.

Learning Outcome: On the completion of this course, students will be able to

- Learn to understand different types of data by C++ language.
- Learn different symbols used in the programming language representing the text variables and constants.
- Learn to develop various operators, loops and nested control statements.
- Learn to generate functions, local and global variables, 1D and 2D array in C++ program.

UNIT-I

Introduction to structured programming: data types- simple data types, floating data types, character data types, string data types, arithmetic operators and operators precedence.

UNIT-II

Variables and constant declarations, expressions, input using the extraction operator `>>` and `cin`, output using the insertion operator `<<` and `cout`, preprocessor directives, increment `(++)` and decrement `(--)` operations.

UNIT-III

Creating a C++ program, input output, relational operators, logical operators and logical expressions, if and if-else statement, switch and break statements, for, while and do-while loops, continue statement, nested control statement.

UNIT-IV Functions, value returning functions, value versus reference parameters, local and global variables, one dimensional array, two dimensional array, pointer data and pointer variables.

Books Recommended

- ✓ *D. S. Malik: C++ Programming Language, Course Technology, Cengage Learning, India Edition, 2009.*
- ✓ *E. Balaguruswami: Object oriented programming with C++, fifth edition, Tata Mc Graw Hill Education Pvt. Ltd., 2008*

Books For Reference

- ✓ *R. Johnsonbaugh and M. Kalin-Applications Programming in ANSI C, Pearson Education.*

- ✓ *S. B. Lippman and J. Lajoie, C++ Primer, 3rd Ed., Addison Wesley, 2000.*
- ✓ *BjarneStroustrup , The C++ Programming Language, 3rd Ed., Addison Wesley, 2010.*
- ✓ *Suggested digital platform: NPTEL/SWAYAM/MOOCs*
- ✓ *e-Learning Source* <http://ndl.iitkgp.ac.in> ; <http://ocw.mit.edu> ;
<http://mathforum.org>

Statistical Methods for Scientists And Engineers

By Prof. Somesh Kumar (NPTEL)

Course Objectives:

- The overall course objective is to understand basic concepts of probability and statistics and to be able to use them to solve engineering problems.
- Understand basic techniques for data summary and data presentation.
- Understand and be able to use basic probability rules and common probability distributions.
- Be able to estimate population parameters from random samples and perform error analyses.
- Be able to understand and apply the basic concepts of statistical inference, confidence limits and hypothesis testing.
- Be able to develop empirical linear models from data and evaluate their statistical properties.
- Be able to understand and apply the concepts of design of experiments and analysis of variance.
- Understand the theory and practice of statistical quality control and quality control charts.

UNIT-I

Review of Probability and Distributions: Rules for probability, random variables and their distributions, moments, special discrete and continuous distributions, laws of large numbers and central limit theorem, sampling distributions.

UNIT-II

Parametric Methods: Point estimation – unbiasedness, consistency, UMVUE, sufficiency and completeness, method of moments, maximum likelihood estimation and method of scoring. Bayes, minimax and admissible estimators. Interval estimation - confidence intervals for means, variances and proportions. Testing of Hypotheses - tests for parameters of normal populations and for proportions, goodness of fit test and its applications.

UNIT-III

Multivariate Analysis: Multivariate normal, Wishart and Hoteling's T 2 distributions and their applications in testing of hypotheses problems. Classification of observations, principal component analysis, canonical correlations and canonical variables.

UNIT-IV

Nonparametric Methods: Empirical distribution function, asymptotic distributions of order statistics, single sample problems, problems of location, prediction intervals, Kolmogorov Smirnov one sample statistics, sign test, Wilcoxon signed rank statistics, two sample problems, Mann-Whitney-Wilcoxon tests, scale problems, Kolmogorov Smirnov two sample criterions

Text Books

- ✓ *An Introduction to Probability and Statistics* by V.K. Rohatgi & A.K. Md.E.Saleh.
- ✓ *Modern Mathematical Statistics* by E.J. Dudewicz & S.N. Mishra
- ✓ *Introduction to Probability and Statistics for Engineers and Scientists* by S.M. Ross
- ✓ *An Introduction to Multivariate Analysis* by T. W. Anderson
- ✓ *Nonparametric Statistical Inference* by J.D. Gibbons & S. Chakraborti

Suggested Readings

- ✓ *Statistical Inference* by G. Casella & R.L. Berger
- ✓ *Applied Multivariate Statistical Analysis* by R.A. Johnson & D.W. Wichern
- ✓ *Nonparametric Inference* by Z. Govindarajulu

For details please visit:

<https://nptel.ac.in/courses/111105077>

Environmental Chemistry

Course Objectives:

The objectives of a course in environmental chemistry typically aim to provide students with a deep understanding of the chemical processes occurring in the environment and their impacts on ecosystems, human health, and the planet as a whole with a comprehensive understanding of the components and processes of environmental systems, including the atmosphere, hydrosphere, lithosphere, and biosphere, and their interactions. Investigation of the chemical composition of environmental compartments, including the atmosphere (air pollutants), hydrosphere (water pollutants), and lithosphere (soil pollutants), and the sources, fate, and transport of pollutants in these compartments. To examine the chemical properties and toxicological effects of environmental pollutants on ecosystems and human health, including acute and chronic toxicity, bioaccumulation, biomagnification, and risk assessment.

Course outcomes:

- Gain a comprehensive understanding of the chemical processes occurring in the environment, including the sources, fate, and transport of pollutants
- Develop analytical skills in environmental chemistry, and apply a range of analytical techniques for the detection, and characterization of environmental pollutants.
- Aware of global environmental issues and challenges such as climate change, pollution, biodiversity loss, and resource depletion.
- Apply the principles of environmental chemistry for mitigating environmental pollution, promoting environmental conservation, and contributing to the development of environmentally friendly technologies and policies.

UNIT I

Environment Introduction, Composition of atmosphere, vertical temperature, heat budget of the earth atmospheric system, vertical stability atmosphere, Biogeochemical Cycles of C, N, P, S and O. Biodistribution of elements. Hydrosphere Chemical composition of water bodies- lakes, streams, rivers and wet lands etc. Hydrological cycle. Aquatic pollution-inorganic, organic, pesticide agricultural, industrial and sewage, detergents, oil spills and oil pollutants. Water quality parameters- dissolved oxygen, biochemical oxygen demand, solids, metals, content of chloride, sulphate, phosphate, nitrate and macro-organisms. Water quality standards, Analytical methods for measuring BOD, DO, COD, F, oils, metals (As, Cd, Cr, Hg, Pb, Se etc) residual chloride and chlorine demand. Purification and treatment of water.

UNIT II

Soils composition, micro and macro nutrients, pollution-fertilizers, pesticides, plastics and

metals, waste treatment Atmosphere Chemical composition of atmosphere-particles, ions and radicals and their formation. Chemical and photochemical reactions in atmosphere, smog formation, oxides of N, C, S, O and their effect, pollution by chemicals, petroleum, minerals, chlorofluorohydrocarbons. Greenhouse effect, acid rain, air pollution controls and their chemistry. Analytical methods for measuring air pollutants. Continuous monitoring instruments.

UNIT III

Industrial Pollution Cement, Sugar, distillery, drug, paper and pulp, thermal power plants, nuclear power plants, metallurgy. Polymers, drugs etc. Radionuclide analysis. Disposal of wastes and their management.

UNIT IV

Environmental Toxicology, Chemical solutions to environmental problems, biodegradability, principles of decomposition.

Text Books

- ✓ *Environmental Chemistry, A. K. De, Wiley Eastern*
- ✓ *Environmental Chemistry, S.E. Manahan, Lewis Publishers*
- ✓ *Environmental Chemistry with Green Chemistry, A. K. Das, Books & Allied (P) Ltd., Kolkata, 1st Edn, 2010*

References Books

- ✓ *Environmental Chemistry, S.E. Manahan, Lewis Publishers*
- ✓ *Environmental Chemistry with Green Chemistry, A. K. Das, Books & Allied (P) Ltd., Kolkata, 1st Edn, 2010*
- ✓ *Environmental Toxicology, Ed. J. Rose, Gordon and Breach Science Publication*
- ✓ *Erach Bh*

Demography

Unit-1:

LO. Understand of key concepts of demography as a discipline

Introduction: Demography - Its Definition, Nature and Scope; Relationship with other disciplines; Demographic Balancing Equation; Sources of Demographic Data in India: Salient Features of Census, Civil Registration System, National Sample Survey, National Family Health Survey; Population Distribution and Growth – Measures and Determinants; Concepts of Rate, Ratio and Proportion.

Unit -II:

LO . Examine population dynamics and resultant socioeconomic issues and problems.

World Population Growth; Doubling time; Population Growth in India; Population Dynamics: Fertility, Mortality and Migration - Measures, Determinants and Implications; Theories of Population - Malthusian Theory and theory of Demographic Transition, Population policies and programmes in India.

Unit-III: Practical

LO. Compare and relate population growth and distribution of developed and developing countries

1. Arithmetic and Geometric Projection - Calculation and Graphical display;
2. Construction of population pyramid,
3. Construction of Lorenz Curve
4. Calculation and presentation of Population Growth Rate, Crude Birth Rate, Age-Specific Fertility Rate, Infant and Neonatal Mortality Rate, Maternal Mortality Ratio Based on Supplied Data.
5. Practical Record and Viva-Voce.

Text Books:

- ✓ *Chandna, R. C. (2015). An Introduction to Population Geography, Kalyani Publishers.*
- ✓ *Hassan, M.I (2020). Population Geography: A Systematic Exposition, Routledge, London and New York.*

Reference Books:

- ✓ *Bhende, A. and Kanitkar T. (2000). Principles of Population Studies, Himalaya Publishing House.*
- ✓ *Pathak, K.B and F. Ram (2016). Techniques of Demographic Analysis, Himalaya Publishing House, Mumbai.*
- ✓ *Srinivasan, K (1998). Basic Demographic Techniques and Applications, Sage Publications, New Delhi.*

TRIBAL GEOGRAPHY

Unit I

LO: *To understand role and determinant of agricultural sector with reference to the nature of Indian agriculture.*

General and Specific characteristics of tribe vis a vis non tribe social structure; Definition: Tribe, Scheduled Tribe, De-notified tribe, Primitive Tribe, Indigenous People, Criminal tribes in India, Particularly Vulnerable Tribal Group; Geographical distribution of tribes in India: demographic and linguistic; Concept of common property resources.

Unit II:

LO: *To understand the diverse tribal livelihoods, cultural practices, and the impacts of industrialization and mining on the economy, ecology, and society of selected tribes in Odisha.*

Tribal livelihoods (hunting & gathering, shifting cultivation, sedentary agriculture, pastoralism, fishing, forestry, agro-forestry, and the recent changes); Occupation, religion, festival, dress, society and tradition of selected tribes (Bonda, Poraja, Bhunjia, Dharua, Kharia, Lodha) of Odisha; Economic, Ecological and Social implication of Industrialization and Mining activities in tribal areas.

Unit III Practical

LO: *To understand the tribes and their knowledge system in relation to their cultural and natural setting and develop appropriate skills for its documentation and communication.*

- Explore the indigenous knowledge systems of a selected tribe, particularly in areas like medicine, agriculture, and environmental management. Compare these with modern practices.
- Conduct ethnographic research to document the festivals, traditional dress, and rituals of a selected tribe. Create a multimedia presentation or documentary to showcase your findings.
- Compare and contrast the social structures of a specific tribe with a neighboring non-tribal community. Focus on aspects like family hierarchy, social roles, and community governance.

Text Books:

- ✓ Mohanty, P.K “*Encyclopedia of Scheduled Tribes in India*” 5 Vols. (2006), Eastern Book Corporation, Delhi.
- ✓ Ahmad, A. 1999. *Social Geography*. Rawat Publication, Jaipur.

Reference Books:

- ✓ Beteille, Andre, 1977: “*The Definition of Tribe*” in Thapar Romesh (ed.), *Tribe, Caste and Religion in India*, The Macmillan Co. of India Ltd., Delhi.
- ✓ Patnaik, N. 2005. *Primitive tribes of Orissa and their development strategies*. University of Michigan.
- ✓ Ray, B.C. & Raya, B.C. 1989. *Tribals of Orissa: The Changing Socio-economic Profile*. University of Michigan.
- ✓ Patti, B. 2019. *Tribals and Dalits in Orissa: Towards a social History of Exclusion*. Oxford University Press, New Delhi.
- ✓ Ghatak, N. K. (2003), “*The Scheduled Tribes of India in the New Millennium: Constitutional Aspect of Identification of Scheduled Tribe in India*”, *The Journal of the Anthropological Survey of India*, vol. 52, no. 1, March, p.89
- ✓ Xaxa, V, 1999: “*Transformation of Tribes in India: Terms of Discourse*”, *Economic and Political Weekly*, No. XXXIV, Volume. 24

